CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 11 FOR CHEMISTRY

CLASSIFICATION OF ELEMENTS AND PERIODICITY

Example

1. Which of the following is/are Doeberiners triad

(i) P, As, Sb (ii) Cu, Ag, Au

(iii) Fe, Co, Ni (iv) S, Se, Te

Correct answer is

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2. The law of triad is applicable to a group of a)Cl, Br, I b)C,N,O c) Na, K, Rb d)H, O, N

A. Cl, Br, I

B. Na, K, Rb

C. S, Se, Te

D. Ca, Sr, Ba

Answer: B

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3. Atomic weight of an element X is 39, and that of element Z is 132, atomic weight of their intermediate element Y, as per Doeberiner triad, will be

A. 88.5

B. 93.0

C. 171

D. 85.5

Answer: D

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4. The law of triad is applicable to a group of

a) Cl, Br, I

b) C, N, O

c) Na, K, Rb

d) H, O, N

A. C, N, O

B. H, O, N

C. Na, K, Rb

D. Cl, Br, I

Answer: D

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5. Which of the following is not a Doeberiner triad

A. Li, Na,K

B. Mg, Ca, Sr

C. Cl, Br, I

D. S,Se, Te

Answer: B

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6. Upto which element, the law of octaves was found to be applicable ?

A. Mendleev

B. Lother Meyer

C. Newland

D. Dobereiners

Answer: C

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7. Which of the following statement is not correct about Lother Meyer's plot of atomic volume against atomic weight ?

A. Alkali metals are at the peak

B. Alkaline earth metals are at the descending portions of the curve.

C. Halogens occupy ascending portions of the curve

D. The elements in the troughs are chemically very reactive.

Answer: D

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8. Which of the following is incorrect regarding atomic radii ?

A. $Na^+ > Al^{3+} < Mg^{2+}$

B. $B < Al > Ga$

C. $Be < Na > Ca$

D. $N < P < As$

Answer: C

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9. In which of the following pairs, the first atom is larger than the second ?

A. N, P

B. Br, Cl

C. Ba, Sr

D. Mg, Al

Answer: A

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10. If other factors being same, the ionisation energy are in the order of

A. $s < p < d < f$

B. $f < d < p < s$

C. $s > d > p > f$

D. $f > d > s > p$

Answer: B

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11. Which of the following factor affects ionisation energy ?

SSSon : S (2) s - sub orbit nearest to nucleus.

A. Size of the atom

B. Magnitude of the nuclear charge

C. Electronic configuration

D. All of these

Answer: D

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12. Which of the following is incorrect reagarding ionisation enthalpy ?

A. $Na^+ > Na$

B. $Mg^{2+} > Mg$

C. $Ga < Al$

D. All of these

Answer: C

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13. The element which has highest 2nd ionisation energy is

A. Period 1, groups 18

B. Period 2, groups 17

C. Period 2, group 1

D. Period 2 group 2

Answer: A

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14. The correct order of electron affinity of halogens

A. $F < Cl < Br < I$

B. $F > Cl > Br > I$

C. $F < Cl > Br > I$

D. $F > Cl < Br < I$

Answer: C

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15. Electron affinity for a noble gas is approximately equal to

A. 0

B. 1

C. Infinity

D. Both (1) and (3)

Answer: A

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16. An element with high electronegativity has:

A. High I.E. and High E.A

B. High I.E. and Low E.A

C. Low I.E. and High E.A.

D. Low I.E. and Low E.A

Answer: A

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17. In which of the following ions oxygen is more electronegative ?

A. ClO^-

B. ClO_2^-

C. ClO_3^-

D. ClO_4^-

Answer: D

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18. The elements having seven valence electrons are known as

A. Inert elements

B. Lanthanides series

C. Transuranic elements

D. Halogens.

Answer: D

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19. The values of IE_1, IE_2, IE_3, IE_4 and IE_5 of an element are $8.1, 14.3, 34.5, 46.8$ and 162.2 eV respectively. The element is likely to be :

A. Na

B. Si

C. F

D. Ca

Answer: B

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Question

1. In Mendeleev's periodic table, gaps were left for the elements to be discovered later. Which of the following elements found a place in the periodic table later ?

A. Sc

B. Tc

C. Ge

D. None of these

Answer: D

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Examples

1. The IUPAC symbol for the element with atomic number 119 would be:

A. Ununnanonium

B. Ununnonanium

C. Ununennium

D. Ununnonium

Answer: C

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2. Lanthanide series start from the elements with atomic number

A. La

B. Th

C. Ce

D. Ac

Answer: B

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3. Term 'Transuranic' means, elements with atomic number

A. > 92

B. > 57

C. > 36

D. > 86

Answer: C

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4. Which of the following is best general electronic configuration of normal element ?

A. $ns^{1-2}np^{0-6}$

B. $ns^{1-2}np^{1-5}$

C. $ns^{1-2}np^{0-5}$

D. $ns^{1-2}np^{1-6}$

Answer: A

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5. Which one of the following pairs of atomic numbers, represents elements belonging to the same group?

A. 5, 13, 30, 53

B. 11, 33, 58, 84

C. 5, 17, 31, 54

D. 9, 31, 53, 83

Answer: D

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6. Which of the following electronic configuration does not be belongs to same block as others

A. $[Xe]4f^{14}5d^{10}6s^2$

B. $[Kr]4d^{10}5s^2$

C. $[Kr]5s^2$

D. $[Ar]3d^6 4s^2$

Answer: C

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7. An element with atomic number 106 has beendiscovered recently. Which of the following electronic configuration will it posses

A. $[Rn]5f^{14}6d^{5}7s^{1}$

B. $[Rn]5f^{14}6d^{5}7s^{2}$

C. $[Rn]5f^{14}6d^{6}7s^{0}$

D. $[Rn]5f^{14}6d^{1}7s^{2}7p^{3}$

Answer: A

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8. An element which is recently discovered is placed in 7th period and 10th group. IUPAC name of the element will be

A. Unnilseptium

B. Ununnilium

C. Ununbium

D. None

Answer: B

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9. The electronic configuration of an element is $1s^2 2s^2 2p^2 3s^2 3p^6 3d^5 4s^1$

This represents its

A. 20

B. 119

C. 111

D. None

Answer: C

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10. Which of the following electronic configuration in the outermost shell is characterstic of alkali metals? A)$(n-1)s^2p^6, ns^2p^1$ B) $(n-1)s^2p^6, d^{10}, ns^1$ C)$(n-1)s^2p^6, ns^1$ D)$(n-1)s^2p^6, ns^1$

A. $(n-1)s^2p^6ns^2p^1$

B. $(n-1)s^2p^6d^{10}ns^1$

C. $(n-1)s^2p^6ns^1$

D. $ns^2np^6(n-1)d^{10}$

Answer: C

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11. In the modern periodic table, elements are arranged in

A. Increasing mass

B. Increasing volume

C. Increasing atomic number

D. Alphabetically

Answer: C

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12. Elements of I B and II B are called

A. Normal elements

B. Transition elements

C. Alkaline earth metals

D. Alkali metals

Answer: B

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13. Group 18 (or zero group) elements are best called as

A. Inert gases

B. Rare gases

C. Noble gases

D. Inactive gases

Answer: C

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Check Your Grasp

1. The discovery of which of the following group of elements gave a death blow to the Newlands Law-

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2. Introduction | Development of Periodic Table

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3. The places that were left empty by Mendeleev were for:

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4. State Modern periodic law.

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5. The electronic configuration of an element is 2, 8, 5. To which group and period does it belong ?

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6. Which one among the following ions, is smallest in size

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7. In the ions P^{3-}, S^{2-} and Cl, the increasing order of size is:

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8. Out of I and I^{+} which has larger size and why ?

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9. Which element has highest first ionization energy?

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10. Among the following elements, which one has the highest ionization energy ?

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11. Out of Na and Mg which has higher second ionisation energy?

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12. Why do halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table?

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13. S has more negative electron gain enthalpy than O why ?

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14. Assertion : Noble gases have highest ionisation enthalpies in their respective periods.

Reason : Noble gases have stable closed shell electronic configuration.

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15. The element with highest electronegativity is

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16. On going from right to left in a period in the periodic table the electronegativity of the elements:

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17. Define electronegativity. How does it differ from electron gain enthalpy ?

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18. (a) Define valency of an element. What valency will be shown by an element having atomic number 14 ?

(b) What is the relation between the valency of an element and the number of valence electrons in its atoms ? Explain with examples.

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19. What is valency of 'Li' w.r.t. H ?

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20. What is valency of 'C' w.r.t. Cl ?

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Evaluate Yourself 1

1. Which of the following statement is wrong about Lother - Meyer's plot between atomic volume against atomic weight ?

A. The most strongly electropositive alkali metals occupy packs on the curve.

B. The stongly electronegative halogen atoms occupy ascending positions on the curve

C. The less strongly electropositive alkaline earth metals occupy desending positions on the curve

D. All are correct

Answer: D

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2. (a) How do the properties of eka-aluminium element predicted by Mendeleev compare with the actual properties of gallium element? Explain your answer.

(b) What names were given by Mendeleen to the then undiscovered elements (i) Scandium (ii) gallium, and (iii) germanium?

A. Eka - aluminum

B. Eka - silicon

C. Eka - germanium

D. Eka - zinc

Answer: A

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3. Which element was named as eka-silicon in Mendeleef classification of elements ?

A. Germanium

B. Gallium

C. Indium

D. Thallium

Answer: A

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Evaluate Yourself 3

1. Which of the following ions has the smallest radius

A. K^+

B. Ca^{2+}

C. Ti^{3+}

D. Ti^{4+}

Answer: D

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2. Which of the following isoelectronic species has the largest radius?

A. O^{2-}

B. F^-

C. Ne

D. Na^+

Answer: D

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3. The ionic radii of N^{3-}, O^{2-} and F^- are respectively given by:

A. $N^{3-} > O^{2-} > F^-$

B. $N^{3-} < O^{2-} < F^-$

C. $N^{3-} > O^{2-} < F^-$

D. $N^{3-} < O^{2-} > F^-$

Answer: A

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4. Sixth typical element is

A. Al

B. Mg

C. S

D. O

Answer: C

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5. Electrons in the outermost shell of an atom are called

A. s - block

B. p - block

C. d - block

D. f - block

Answer: D

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6. Which of the following statement is wrong

A. All the actinides are synthetic (man made) elements

B. In the Lanthanides last electron enters in 4f orbitals

C. Np_{93} onwards are transuranic elements

D. Lanthanum is d - block element

Answer: A

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7. Which of the following statement is wrong

A. Total no. of liquid elements in the periodic table .... Six

B. First metal element in the periodic table is Li

C. All type of elements are present in 6th period

D. Iodine is a gaseous element

Answer: D

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8. What will be the value of screening constant (σ) for the sodium atom?

A. 17.15

B. 3.0

C. 8.8

D. 6.4

Answer: C

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9. Screening effect is not observed in :

A. He

B. Be

C. H

D. All of these

Answer: D

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Evaluate Yourself 4

1.

Column-I	Column-II
(A) Electron affinity	(P) Depends upon effective nuclear charge.
(B) Ionisation potential	(Q) Depends upon shielding constant
(C) Electronegativity	(R) Depends upon half filled and fully filled el
	(S) Units K-Cal/mole

A. atomic size

B. type of electron

C. nuclear charge

D. type of bonding in crystal lattice

Answer: D

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2. Ionization potential of phosphorus is greater than that of sulphur because -

A. of its smaller size

B. of more penetrating power of p - orbitals

C. its nuclear force of attraction on electrons

D. half-filled orbitals are more stable

Answer: D

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3. The ionisation potential is lowest for the

A. halogens

B. inert gas

C. Alkaline earth metals

D. Alkali metals

Answer: D

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4. If I_1, I_2 and I_3 etc. represent the successive ionization potentials of an atoms then the correct order is :

A. $I_1 > I_2 > I_3$

B. $I_1 < I_2 > I_3$

C. $I_3 > I_2 > I_1$

D. $I_2 > I_1 > I_3$

Answer: C

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5. What is the correct order of ionisation energy

A. $B > Al \leq Ga > In < TI$

B. $B < Al > Ga > In > TI$

C. $B > Al > Ga > In > TI$

D. $B > Al \leq Ga < InTI$

Answer: A

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6. The correct order of decreasing second ionisation energy of Li, Be, Ne,C,B

A. $Ne > B > Li > C > Be$

B. $Li > Ne > C > B > Be$

C. $Ne > C > B > Be > Li$

D. $Li > Ne > B > C > Be$

Answer: D

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7. Which of the following element has the highest ionisation enregy ?

A. Ti

B. Zr

C. Hf

D. None of these

Answer: C

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8. What is the correct order of ionisation energy

A. $K < Cu < Cu^+ < K^+$

B. $K < Cu^+ < Cu < K^+$

C. $Cu^+ < K < Cu < K^+$

D. $K^+ < Cu^+ < Cu < K$

Answer: A

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Evaluate Yourself 5

1. The process requiring the absorption of energy is

A. $F \rightarrow F^-$

B. $Cl \rightarrow Cl^-$

C. $O^- \rightarrow O^{-2}$

D. $H \rightarrow H^-$

Answer: C

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2. Exothermic process is -

A. $Na \rightarrow Na^- + e$

B. $O + e \rightarrow O^-$

C. $O^- + e \rightarrow O^{-2}$

D. $Cl^- \rightarrow Cl + e$

Answer: B

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3. The correct order of electron affinity of B, C, N, O is

A. $C > N < O < F$

B. $C > N < O > F$

C. $C < N > O < F$

D. $C > N > O > F$

Answer: A

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Evaluate Yourself 6

1. Which of the following groups of elements is assigned zero electronegativity ?

A. noble gases

B. alkali metals

C. Alkaline earth metals

D. rare earths

Answer: A

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2. The electronegativity of the following elements increases in the order

A. C, N, Si, P

B. N, Si, C, P

C. Si, P, C, N

D. P, Si, N, C

Answer: C

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3. The correct order of relative basic character of $NaOH$, $Mg(OH)_2$ and $Al(OH)_3$ is

A. $Al(OH)_3 > Mg(OH)_2 > NaOH$

B. $Mg(OH)_2 > NaOH > Al(OH)_3$

C. $NaOH > Mg(OH)_2 > Al(OH)_3$

D. $Al(OH)_3 > NaOH < Mg(OH)_2$

Answer: C

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Evaluate Yourself 7

1. Group number and valency has relation in

A. First group

B. Second group

C. Group 14

D. Zero group

Answer: D

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2. Which of the following elements has zero electron affinity ?

A. Platinum

B. Gold

C. Sulphur

D. Neon

Answer: D

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3. The first four ionization energies of an element are $191, 578, 872$, and $5962 \mathrm{kcal}$. The number of valence electrons in the element is.

A. 1

B. 2

C. 3

D. 4

Answer: C

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CUQ

1. Lother Meyer obtained the curve for the known elements by plotting their atomic volumes against

A. Atomic numbers

B. Atomic masses

C. Densities

D. Ionization energies

Answer: B

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2. In Lother Meyer plot, the peaks are occupied by

A. Alkali metal

B. Alkaline earth metals

C. Halogens

D. Noble gases

Answer: A

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3. The law of triad is applicable to a group of a)Cl, Br, I b)C,N,O c) Na, K, Rb d)H, O, N

A. Cl, Br, I

B. C, N, O

C. Na, K, Rb

D. H, O, N

Answer: A

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4. The atomic number of element Unq is:

A. 102

B. 103

C. 104

D. 105

Answer: C

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5. The basis for the classification of elements in the modern periodic table is

A. Electronic configuration

B. Atomic weight

C. Atomic volume

D. Equivalent weight

Answer: A

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6. Considering the chemical properties, atomic weight of Be was corrected based on

A. Electronic configuration

B. Valency

C. Atomic number

D. Both 2 and 3

Answer: B

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7. Mendeleev corrected the atomic weight of :

A. Be

B. N

C. O

D. Cl

Answer: A

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8. Anamalous pair in Mendeleef's table is

A. Li, Na

B. Mg, Al

C. Co, Ni

D. Be, B

Answer: C

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9. Eka silicon is now called as

A. Gallium

B. Scandium

C. Germanium

D. Indium

Answer: C

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10. The atomic weights of "Be" and "In" were correctly by Mendeleef using for formula

A. $\sqrt{v} = a(Z - b)$

B. $mvr = \frac{nh}{2\pi}$

C. Atomic weight = Equivalent weight $\times$ valency

D. Equivalent weight = Atomic weight $\times$ valency

Answer: C

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11. The plot of $\sqrt{v}$ vs Z is

A. Straight line

B. Exponential curve

C. Hyperbolic

D. Curve with - ve slope

Answer: A

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12. The longest and shortest periods are

A. 1 & 6

B. 2 & 6

C. 6 & 1

D. 1 & 7

Answer: C

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13. The number of elements present in the fourth period is

A. 32

B. 18

C. 8

D. 2

Answer: B

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14. The general electronic configuration elements of carbon family

A. ns^2np^4

B. ns^2np^3

C. ns^2np^1

D. ns^2np^2

Answer: D

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15. The strong element of fifth period is

A. K

B. Rb

C. Kr

D. Xe

Answer: B

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16. Which of these does not reflect the periodicity of the elements.

A. Bonding behaviour

B. Electron negativity

C. Ionization potential

D. Neutron/proton ratio

Answer: D

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17. The atomicity of noble gases is

A. 2

B. 1

C. 4

D. 6

Answer: B

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18. The element with atomic numbers 19 is

A. Halogen

B. Chalcogen

C. Noble gas

D. An alkali metal

Answer: D

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19. Which of the following pair of atomic numbers represents s-block element ?

A. 7, 15

B. 6, 12

C. 9, 17

D. 3, 12

Answer: D

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20. The element with electron configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^5$ belongs to

A. 4th period, VA group

B. 5th period, IVA group

C. 4th period, VIIA group

D. 7th period, IVA group

Answer: C

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21. The element with ns^2np^4 as outer electron configuration is a

A. Alkalimetal

B. Chalcogen

C. Noble gas

D. Halogen

Answer: B

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22. If the differentiating electron enters (n-1) d-sublevel. The element is

A. A representative element

B. A noble gas

C. An alkali metal

D. A transition element

Answer: D

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23. Atoms with three of their outer most orbits incompletety filled with electrons are present in

A. Lanthanides

B. Representative elements

C. s-block elements

D. Transitional elements

Answer: A

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24. The name of the element with atomic number 100 was adopted in honour of

A. Alfred Noble

B. Enric Fermi

C. Dimitri Mendeleef

D. Albert Einstein

Answer: B

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25. Inner transition elements exhibit different coloured compounds on account of unfilled .....Orbitals

A. s

B. f

C. d

D. p

Answer: B

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26. The total numbers of elements in the Group 11 is

A. 3

B. 5

C. 7

D. 9

Answer: A

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27. The atomic numbers of elements of second transition series lie in the range of

A. 38 to 47

B. 39 to 48

C. 40 to 49

D. 41 to 50

Answer: B

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28. Atomic number of next inert gas to be discovered will be

A. 87

B. 104

C. 118

D. 132

Answer: C

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29. The element with atomic number 12 belongs to.....Group and.....period

A. IA, third

B. IIIA, third

C. IIA, third

D. IIA, second

Answer: C

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30. Elements which generally exhibit multiple oxidation states and whose ions are usually coloured are

A. Metalloids

B. Transition elements

C. Non - metals

D. Gases

Answer: B

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31. Ce-58 is a member of

A. s - block

B. p - block

C. d - block

D. f - block

Answer: D

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32. The outer most orbit of an element "X" is partially filled with electrons in 's' and 'p' subshells. Then that element is

A. An inert gas

B. A representative element

C. A transition element

D. An innner transition element

Answer: B

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33. Which is the atomic number of another element present in the same group as the element with $Z = 13$ is present A)$Z = 14$ B)$Z = 32$ C) $Z = 49$ D)$Z = 20$

A. Z = 14

B. Z = 32

C. Z = 49

D. Z = 20

Answer: C

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34. Which statement is incorrect for the d-block elements A)Have atomic radii larger than s and p-block elements B)Have high melting points, boiling points an tensile strength C)Have variable oxidation states D)Exhibit catalytic activity

A. Have atomic radii larger than s and p - block elements

B. Have high melting points, boiling points and tensile strength

C. Have variable oxidation states

D. Exhibit catalytic process

Answer: A

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35. When a neutral atom is converted to the anion its

A. Atomic number increases

B. Atomic number decreases

C. Size increases

D. Mass number increases

Answer: C

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36. The term periodicity in the properties of element are arranged in the increasing order of their atomic numbers similar elements

A. Reoccur after a fixed interval

B. Reoccur after certain regular interval

C. Form vertical groups

D. Form horizontal rows

Answer: B

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37. The correct order of variation in the sizes of atoms is Be , C , F , Ne

A. $Be > C > F > Ne$

B. $Be < C < F < Ne$

C. $Br > C > F < Ne$

D. $F > Ne > Be > C$

Answer: C

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38. Which one of the following has the largest radius A)Na^+ B)Mg^{2+} C) O^{2-} D)Al^{3+}

A. Na^+

B. Mg^{2+}

C. O^{2-}

D. Al^{3+}

Answer: C

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39. Atomic radii of fluorine atom and neon atom in angstrom units are respectively given by A)0.762, 1.60 B)1.60, 1.60 C)0.72, 0.72 D)1.60,0.762

A. $0.762, 1.60$

B. $1.60, 1.60$

C. $0.72, 0.72$

D. $1.60, 0.762$

Answer: A

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40. Which one is the correct order of the size of the iodine species ? A) $I > I^+ > I^-$ B)$I > I^- > I^+$ C)$I^+ > I^- > I$ D)$I^- > I > I^+$

A. $I > I^+ > I^-$

B. $I > I^- > I^+$

C. $I^+ > I^- > I$

D. $I^- > I > I^+$

Answer: D

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41. Atomic radius is measured by A)Rutherford's α-ray scattering experiment B) X-ray diffraction technique C)Mulliken oil drop method D)Thomson's water-melon model

A. Rutherford's α - ray scattering experiment

B. X - ray diffraction technique

C. Mulliken oil drop method

D. Thomson's water melon model

Answer: B

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42. Vander waal's radius is used for

A. Molecular substances in gaseous state only

B. Molecular substances in liquid state only

C. Molecular substances in solid state only

D. Molecular substances in any state

Answer: C

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43. Separation of lanthanides from their mixture is not easy because of

A. Shielding effect

B. Pentetrating effect

C. Consequences of lanthanide contraction

D. Inert pair effect

Answer: C

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44. If atomic radius of F is XA^0 then atomic radius of Ne could be

A. $< XA^{\circ}$

B. $> XA^{\circ}$

C. $= XA^{\circ}$

D. Half of 'F'

Answer: B

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45. If an element 'X' is assumed to have the types of radii, then their order is

A. Crystal radius $>$ Vander waals radius $>$ Covalent radius

B. Vander waals radius $>$ Crystal radius $>$ Covalent radius

C. Covalent radius $>$ Crystal radius $>$ Vander waals radius

D. Vander waals radius $>$ Covalent radius $>$ Crystal radius

Answer: B

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46. Covalent radius of $Li$is $123 \pm$ .The crystal radius of Li will be:

A. > 123 pm

B. < 12 pm

C. $+123$ pm

D. $= \frac{123}{2}$ pm

Answer: B

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47. O^{2-} and Si^{4+} are isoelectronic ions. If the ionic radius of O^{2-} is $1A^0$, the ionic radius of Si^{4+} will be

A. $1.4A^\circ$

B. $0.41A^\circ$

C. $2.9A^\circ$

D. $1.5A^\circ$

Answer: B

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48. Which set represents isoelectronic species ? A) $Na^+, Mg^{2+}, Al^{3+}, Cl^-$ B) $Na^+, Ca^{2+}, Sc^{3+}, F^-$ C) $K^+, Cl^-, Mg^{2+}, Sc^{3+}$ D) $K^+, Cl^-, Ca^{2+}, Sc^{3+}$

A. $Na^+, Mg^{2+} Al^{3+}, Cl^-$

B. $Na^+, Ca^{2+}, Sc^{3+}, F^-$

C. $K^+, Cl^-, Mg^{2+}, Sc^{3+}$

D. $K^+, Cl^-, Ca^{2+}, Sc^{3+}$

Answer: D

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49. Which of the following pairs of ions have the same electronic configuration A)Cr^{+3}, Fe^{+3} B)Fe^{+3}, Mn^{+2} C)Fe^{+3}, Co^{+3} D) Sc^{+3}, Cr^{+3}

A. Cr^{+3}, Fe^{+3}

B. Fe^{+3}, Mn^{+2}

C. Fe^{+3}, Co^{+3}

D. Sc^{+3}, Cr^{+3}

Answer: B

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50. Which one of the following groups represent a collection of isolectronic species ? (At.no $Cs = 55, Br = 35$)

A. Ca^{2+}, Cs^{2+}, Br

B. Na^+, Ca^{2+}, Mg^{2+}

C. N^{3-}, F^-, Na^+

D. Be, Al^{3+}, Cl^+

Answer: C

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51. In a period, atom with smaller radius is

A. Chalcogen

B. Halogen

C. Aerogen

D. Pnicogen

Answer: B

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52. As number of protons is the nucleus increases, atomic radius gradually.....in a period

A. Increases

B. Decreases

C. No change

D. Stable

Answer: B

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53. The Lanthanide contraction is responsible for the fact that

A. Zr and Hf have same radius

B. Zr and Zn have the same oxidation state

C. Zr and Y have same radius

D. Zr and Nb have similar oxidation state

Answer: A

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54. The increasing order of the atomic radius of Si, S, Na, Mg, Al is

A. $S < Si < Al < Mg < Na$

B. $Na < Al < Mg < S < Si$

C. $Na < Mg < Si < Al < S$

D. $Na < Mg < Al < Si < S$

Answer: A

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55. Which of the following process refers to ionisation potential ?

A. $X_{(s)} \rightarrow X^{+}_{(g)} + e^{-}$

B. $X_{(g)} + aq \rightarrow X^{+}_{(aq)} + e^{-}$

C. $X_{(g)} \rightarrow X^{+}_{(g)} + e^{-}$

D. $X_{(g)} + e^{-} \rightarrow X^{-}_{(g)}$

Answer: C

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56. The element with highest ionisation potential is

A. Nitrogen

B. Oxygen

C. Helium

D. Neon

Answer: C

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57. In the long form of periodic table elements with low ionisation potential are present in

A. I A group

B. IV A group

C. VII A group

D. Zero group

Answer: A

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58. As atomic number of elements increases I.P. value of the elements of the same

A. Decreases

B. Increases

C. Remains constant

D. First increases and then decreases

Answer: B

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59. The ionization potential values of an element are in the following order $I_1 < I_2 < \ < \ < \ < I_3 < I_4 < I_5$. The element is

A. Alkali metal

B. Chalcogen

C. Halogen

D. Alkaline earth metals

Answer: D

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60. Which of the following elements has the lowest ionization potential ?

A. N

B. O

C. F

D. Ne

Answer: B

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61. The ionisation energy of nitrogen is more than that of oxygen because

A. of the extra stability of half-filled p orbitals in nitrogen

B. of the smaller size of nitrogen

C. The former contains less number of electrons

D. The former is less electronegative

Answer: A

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62. The correct order of the second ionisation potential of carbon, nitrogen, oxygen and fluorine is

A. $C > N > O > F$

B. $O > N > F > C$

C. $O > F > N > C$

D. $F > O > N > C$

Answer: C

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63. The I_1 values of Li, Be and C are $5.4eV/\text{atom}$, $9.32eV/\text{atom}$ and $11.26eV/\text{atom}$. The I_1 value of Boron is

A. 13.6 eV/atom

B. 8.29 eV/atom

C. 14.5 eV/atom

D. 21.5 eV/atom

Answer: B

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64. The ionisation potential of "X" ion is equal to

A. The electron affinity of "X" atom

B. The electronegativity of "X" atom

C. The ionisation energy of "X" atom

D. The electron affinity of $''X^{2+}''$ ion

Answer: D

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65. The I_1 of potassium is $4.339eV/\text{atom}$. The I_1 of sodium

A. 4.339

B. 2.21

C. 5.138

D. 1.002

Answer: C

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66. The first ionization potentials of four consecutive elements present in the second period of periodic table are 8.3, 11.3, 14.5, and 13.6 eV respectively which one of the following is the first ionization potential of nitrogen ?

A. 13.6

B. 11.3

C. 8.3

D. 14.5

Answer: D

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67. Which of the following transitions involves maximum amount of energy?

A. $M^{-}(g) \rightarrow M(g)$

B. $M(g) \rightarrow M^{+}(g)$

C. $M^{+}(g) \rightarrow M^{2+}(g)$

D. $M^{2+}(g) \rightarrow M^{3+}(g)$

Answer: D

Watch Video Solution

68. The I_1, I_2, I_3, I_4 values of an element "M" are 120 kJ/mole, $600kJ/\text{mole}$, $1000kJ/\text{mole}$ and $8000kJ/\text{mole}$. Then the formula of its sulphate is

A. MSO_4

B. $M_2(SO_4)_3$

C. M_2SO_4

D. $M_3(SO_4)_2$

Answer: B

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69. The electronic configuration of element $A, B,$ and $C$are $[He]2s^1$, $[Ne]3s^1$, and $[Ar]4s^1$, respectively. Which one of the following order is correct for the $IE_1\left(\text{in}kJmol^{-1}\right)$ of A,$B,$ and C?

A. $A > B > C$

B. $C > B > A$

C. $B > C > A$

D. $C > A > C$

Answer: A

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70. Which of the following species has the highest ionization potential

A. Li^+

B. Mg^+

C. Al^+

D. Ne

Answer: A

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71. The low electron affinity value of nitrogen is due to

A. Small size

B. High nuclear charge

C. Half - filled 2p sublevel

D. High metallic character

Answer: C

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72. Energy is released in the process of

A. $Na_{(g)} \rightarrow Na^{+}_{(g)} + e$

B. $I^{-}_{(g)} + e \rightarrow O^{-2}_{(g)}$

C. $O_{(g)} + e \rightarrow O^{-}_{(g)}$

D. $N_{(g)}^{-2} + e \rightarrow N_{(g)}^{-3}$

Answer: C

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73. Electron affinity values are obtained indirectly by

A. Electric discharge method

B. Born - Haber cycle method

C. Electron microscopic method

D. Mulliken oil drop method

Answer: B

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74. Energy is absorbed when a second electron is added to oxygen. This is because

A. O^- has stable configuration

B. O^- has repulsion with electron to be added

C. O^- has lower nuclear charge than O

D. O^{2-} has unstable configuration

Answer: B

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75. The decreasing order of electron affinity of halogen's is

A. $F > Cl > Br > I$

B. $F < Cl < Br < I$

C. $F < Cl > Br < I$

D. $Cl > F > Br > I$

Answer: D

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76. The electron affinity values (in $kJmol^{-1}$) of three halogens, X, Y and Z are respectively -349, -333 and -325. Then X, Y and Z are respectively

A. F_2, Cl_2 and Br_2

B. Cl_2, F_2 and Br_2

C. Cl_2, Br_2 and F_2

D. Br_2, Cl_2 and F_2

Answer: B

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77. For univalent elements, the average value of first ionization potential and first electron affinity is equal to its

A. Polarising power

B. Covalent radius

C. Electronegativity

D. Dipole moment

Answer: C

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78. The reference element in Paulings scale of Electronegativity is

A. H

B. O

C. N

D. Cl

Answer: A

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79. Electronegativity is the property related to

A. Isolated atom in gaseous state

B. Isolated atom in solid state

C. Inert gas

D. Bonded atoms in a molecule

Answer: D

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80. The values that are useful in writing chemical formulae and in calculation of oxidation states are

A. Ionisation potential

B. Electron affinity

C. Electronegativity

D. Metallic character

Answer: C

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81. Let electronegativity, ionisation energy and electron affinity by represented as EN, IP and EA respectively. Which one of the following equation is correct according to Mulliken ?

A. EN = IP' EA

B. EN = IP/EA

C. EN = (IP + EA)/2

D. EN = IP - EA

Answer: C

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82. In which group all the elements do not have same number of valence electrons?

A. Zero

B. First

C. Second

D. Seventh

Answer: A

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83. Metal exhibiting higher oxidation state is in which block ?

A. p

B. s

C. d

D. f

Answer: C

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84. Among the following outermost configurations of transitionn metals, which shows the highest oxidation state

A. $3d^3 4s^2$

B. $3d^5 4s^1$

C. $3d^5 4s^2$

D. $3d^6 4s^2$

Answer: C

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85. The less electropositive element is

A. Na

B. Be

C. Li

D. Mg

Answer: B

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86. Electropositivity is very high for

A. Al

B. Ge

C. Li

D. Ba

Answer: D

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87. The most electropositive element is

A. Cs

B. C

C. Cl

D. K

Answer: A

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88. Which one of the following electronic configurations corresponds to the most electropositive character?

A. $[He]2s^1$

B. $[He]2s^2$

C. $[Xe]6s^1$

D. $[Xe]6s^2$

Answer: C

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89. Most metallic element has the following electron arrangement in its atom is

A. 2, 8, 4

B. 2, 8, 8

C. 2, 8, 8, 1

D. 2, 8, 8, 7

Answer: C

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90. Among (a) Na_2O (b) MgO, (c) Al_2O_3, (d) P_2O_5 (e) Cl_2O_7 the most basic, most acidic and amphoteric oxide can be

A. a, b, c

B. b, e, c

C. a, e, c

D. e, c, a

Answer: C

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91. Which of the following cannot form an amphoteric oxide ?

A. Al

B. Sn

C. Sb

D. P

Answer: D

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92. The elements x,y and z are present in one period of the periodic table. Chemically their oxides are acidic, amphoteric and basic respectively. When these elements are arranged in ascending order of atomic number they are

A. x, y, z

B. z, y, x

C. y, z, x

D. y, x, z

Answer: B

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93. Boron and Silicon resemble chemically. This is due to the equal value of their

A. EA

B. Atomic Volume

C. Polarizing power of ions

D. Nuclear charge

Answer: C

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94. The electronegativity of Be is same as that of

A. Al

B. Mg

C. Na

D. Li

Answer: A

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95. Beryllium shows diagonal relationship with aluminum . Which of the following similarity is incorrect?

A. Be_2C like Al_4C_3 yields methane on hydrolysis

B. Be, like Al is rendered passive by HNO_3

C. $Be(OH)_2$ like $Al(OH)_3$ is basic

D. Be forms beryllates and Al forms aluminate

Answer: C

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96. Diagonal relationship is shown by

A. B - S

B. Li - Mg

C. Mg - Ca

D. S - Se

Answer: B

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97. Diagonal relationsgip is quite pronounced in the elements of

A. 2^{nd} & 3^{rd} periods

B. 1^{st} & 2^{nd} periods

C. II & III groups

D. 3^{rd} & 4^{th} periods

Answer: A

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98. The pair of elements that have similar chemical properties are

A. Lithium and Magnesium

B. Beryllium and Boron

C. Aluminium and Magnesium

D. Carbon and Nitrogen

Answer: A

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Exercise 1 C W

1. Which of the following is not an actinoid?

A. Curium (Z = 96)

B. Californium (Z = 98)

C. Uranium (Z = 92)

D. Terbium (Z = 65)

Answer: D

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2. The period number in the long form of the periodic table is equal to

A. magnetic quantum number of any element of the period

B. atomic number of any element of the period

C. maximum Principal quantum number of any element of the period

D. maximum Azimuthal quantum number of any element of the period

Answer: C

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3. The elements in which electrons are progressively filled in 4f-orbitals are calleD:

A. actinoids

B. Transition elements

C. lanthanoids

D. halogens

Answer: C

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4. Which of the following set of elements follows Dobereiner's law of triads ?

A. Fe, Co, Ni

B. Li, Na, K

C. Ru, Rh, Pd

D. Os, Ir, Pt

Answer: B

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5. The discovery of which of the following group of elements gave a death blow to the Newlands Law-

A. Inert gases

B. Alkaline earths

C. Rare earths

D. Actinides

Answer: A

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6. Elements which occupied position in the lother meyer curve, on the peaks, were

A. V

B. Se

C. K

D. La

Answer: C

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7. The alpha helix in a protein is classified as the

A. Newland

B. Mendeleev

C. Lother Meyer

D. De Chancourtois

Answer: D

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8. Which is incorrect statement in respect of Mendeleev's periodic table ?

A. It has made the study of elements easier and systematic

B. It has helped in correcting the doubtful atomic weights

C. It has paved the way for the discovery of new elements

D. Mendeleev placed isotopes of the elements at the same position in the periodic table

Answer: D

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9. (a) How do the properties of eka-aluminium element predicted by Mendeleev compare with the actual properties of gallium element?

Explain your answer.

(b) What names were given by Mendeleen to the then undiscovered elements (i) Scandium (ii) gallium, and (iii) germanium?

A. eka-aluminium

B. eka-silicon

C. cka-gcrmanium

D. eka - zinc

Answer: A

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10. Consider the isoelectronic species, Na^+, Mg^{2+}, F^- and O^{2-}. The correct order of increasing length of their radii is:

A. $F^- < O^{2-} < Mg^{2+} < Na^+$

B. $Mg^{2+} < Na^+ < F^- < O^{2-}$

C. $O^{2-} < F^- < Na^+ < Mg^{2+}$

D. $O^{2-} < F^{-} < Mg^{2+} < Na^{+}$

Answer: B

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11. Which one of the following is correct order of the size of iodine species ?

A. $I > I^{-} > I^{+}$

B. $I^{+} > I^{-} > I$

C. $I > I^{+} > I^{-}$

D. $I^{-} > I > I^{+}$

Answer: D

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12. The atomic radii in case of inert gases is

A. ionic radii

B. covalent radii

C. van der Waals radii

D. none

Answer: C

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13. Which of the following sequence of elements is arranged in the order of increasing atomic radii?

A. Na, Mg, Al, Si

B. C, N, O, F

C. O, S, Se, Te

D. I, Br, Cl, F

Answer: C

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14. Which of the following sets contain only isoelectronic species?

A. $N^{3-}, O^{2-}, Cl^{-}, Ne$

B. $F^{-}, Ar, S^{2-}, Cl^{-}$

C. $P^{3-}, S^{2-}, Cl^{-}, Ar$

D. $N^{3-}, F^{-}, O^{2-}, Ar$

Answer: C

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15. The ionic species having largest size is

A. $Li^{+}(g)$

B. $Na^+(aq)$

C. $Rb^+(aq)$

D. $Li^+(aq)$

Answer: C

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16. The first ionisation potential of Na, Mg, Al and Si are in the order

A. $Na < Mg > Al < Si$

B. $Na > Mg > Al > Si$

C. $Na < Mg < Al < Si$

D. $Na > Mg > Al < Si$

Answer: A

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17. Arrange S, P and As in order of increasing ionisation energy.

A. $S < P < As$

B. $P < S < As$

C. $As < S < P$

D. $As < P < S$

Answer: D

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18. The element with the highest first ionization potential is:

A. H

B. Rn

C. F

D. He

Answer: D

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19. Which of the following represents the correct order of increasing first ionization enthalpy for Ca, Ba, S , Se and Ar ?

A. $Ca < Ba < S < Se < Ar$

B. $Ca < S < Ba < Se < Ar$

C. $S < Se < Ca < Ba < Ar$

D. $Ba < Ca < Se < S < Ar$

Answer: D

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20. The second electron gain enthalpies (in kJ mol^{-1}) of oxygen and sulphur respectively are:

A. $-780, +590$

B. $-590, +780$

C. $+590, +780$

D. $+780, +590$

Answer: D

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21. The electronic configurations of four elements are given below. Arrange these elements in the correct order of the magnitude (without sign) of their electron affinity

(i) $2s^2 2p^5$ (ii) $3s^2 3p^5$

(iii) $2s^2 2p^4$ (iv) $3s^2 3p^4$

Select the correct answer using the codes given below:

A. $3 < 4 < 1 < 2$

B. $2 < 1 < 4 < 3$

C. $1 < 3 < 4 < 2$

D. $3 < 4 < 2 < 1$

Answer: A

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22. Which of the following processes involves absorption of energy?

A. $Cl + e^- \rightarrow Cl^-$

B. $O^- + e^- \rightarrow O^{2-}$

C. $O + e^- \rightarrow O^-$

D. $S + e^- \rightarrow S^-$

Answer: B

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23. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl?

A. $S < O < Cl < F$

B. $Cl < F < O < S$

C. $O < S < F < Cl$

D. $F < S < O < Cl$

Answer: C

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24. The order of electron gain enthalpy (magnitude) of O, S and Se is:

A. $O > S > Se$

B. $S > O > Se$

C. $Se > O > S$

D. $S > Se > O$

Answer: D

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25. The outermost electronic configuration of the least reactive element is

A. $2s^2 2p^5$

B. $3S^2 3P^6$

C. $2s^2 2p^4$

D. $6s^2 6p^6 7s^1$

Answer: D

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26. Which one of the following is incorrect ?

A. An element which has high electronegativity always has high electron gain enthalpy

B. Electron gain enthalpy is the property of an isolated at

C. Electronegativity is the property of a bonded atom

D. Both electronegativity and electron gain enthalpy are usually directly related to nuclear charge and inversely related atomic size

Answer: A

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27. Pauling 's electronegativity scale is based upon experimental values of

A. bond lengths

B. atomic radii

C. bond energies

D. electron gain enthalpies

Answer: C

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28. Increasing order of electronegativity is

A. Si, P, Se, Br, Cl, O

B. Si, P, Br, Se, Cl, O

C. P, Si, Br, Se, Cl, O

D. Se, Si, P, Br, Cl, O

Answer: A

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Exercise 1 H W

1. Which of the following pair has both members from the same group of the periodic table?

A. Na - Ca

B. Na - Cl

C. Ca - Cl

D. Cl - Br

Answer: D

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2. The element having electronic configuration $[Kr]4d^{10}4f^{14}5s^25p^65d^26s^2$ belongs to

A. s - block

B. p -block

C. d - block

D. f - block

Answer: C

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3. An atom with atomic number 21 belongs to the category of

A. s - block elements

B. p - block elements

C. d - block elements

D. f - block elements

Answer: C

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4. Which of the following is general is general electron configuration of 4d series?

A. $4s^{1 \text{ to } 2}3d^{1 \to 10}$

B. $4s^{1 \text{ to } 2}4d^{1 \text{ to } 10}$

C. $5s^{1 \text{ to } 2}5d^{1 \text{ to } 10}$

D. $5s^{1 \text{ to } 2}4d^{1 \text{ to } 10}$

Answer: D

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5. In a given transition series the elements differ generally in the number of electrons of

A. p

B. d

C. p, d & f

D. p & d

Answer: B

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6. Transition elements are placed in the periodic table between the group

A. IA and IIA

B. IIA and IIIA

C. IIIA and IV A

D. VII and zero

Answer: B

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7. Regarding transitional elements the wrong statement is

A. They exhibit variable valencies

B. They possess low M.P.'s

C. They are good catalysts

D. They form coloured complexes.

Answer: B

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8. The electron configuration of the element 'M' is $[Ar]3d^{10}4s^24p^3$. Then 'M' belong to

A. VB group

B. VIII group

C. VA group

D. 0 group

Answer: C

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9. Which of the following is the smallest in size?

A. Br

B. I^-

C. I

D. Br^-

Answer: A

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10. The correct order of atomic radii is

A. $Ce > Sn > Yb > Lu$

B. $Sn > Ce > Lu > Yb$

C. $Lu > Yb > Sn > Ce$

D. $Sn > Yb > Ce > Lu$

Answer: A

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11. The element with the following atomic number may be bigger than aluminium atom is

A. 12

B. 14

C. 16

D. 17

Answer: A

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12. Which among the following group elements are smaller in size

A. IA group

B. II A group

C. VII A group

D. VI A group

Answer: C

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13. Which of the following is an example of a positive ion and negative ion that is isoelectronic with Argon

A. K^+ and Cl^- or Ca^{2+} and S^{2-}

B. Na^+ and F^- or Mg^{2+} and O^{2-}

C. K^+ and I^- or Mg^{2+} and S^{2-}

D. K^+ and I^- or Ca^{2+} and O^{2-}

Answer: A

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14. The ionization potential (I_1) of nitrogen $(Z = 7)$ is more than oxygen $(Z = 8)$. This is explained with

A. Hund's rule

B. Excitation rule

C. Pauli principle

D. Auf - bau principle

Answer: A

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15. Second ionization potential value is very low for

A. Sodium

B. Magnesium

C. Fluorine

D. Oxygen

Answer: B

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16. I_1 of an element X is $899 \ \ \mathrm{kJ\ mole^{-1}}$ and that of another element Y is $801 \ \ \mathrm{kJ\ mole^{-1}}$. Then X and Y may be

A. Li, Be

B. Be, B

C. B, C

D. C, N

Answer: B

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17. The first ionisation in electron volts of nitrogen and oxygen atoms are, respectively , given by

A. $14.6, 13.6$

B. $13.6, 14.6$

C. $13.6, 13.6$

D. $14.6, 14.6$

Answer: A

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18. The second ionisation energy of N and O in electron volt are respectively given by:

A. 29,29

B. 34,34

C. 29,34

D. 34,29

Answer: C

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19. The first ionisation potential of Na, Mg, Al and Si are in the order

A. $Na < Mg > Al < Si$

B. $Na > Mg < Al > Si$

C. $Na < Mg > Al > Si$

D. $Na > Mg > Al < Si$

Answer: A

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20. Electrons which have the highest penetrating power through lower orbits are

A. p - electrons

B. s - electrons

C. d - electrons

D. f - electrons

Answer: B

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21. A sudden large jump between the values of second and third ionisation energies of an element would be associated with the electronic configuration

A. $1s^2 2s^2 2p^6 3s^1$

B. $1s^2 2s^2 2p^6 3s^2 3p^1$

C. $1s^2 2s^2 2p^6 3s^2$

D. $1s^2 2^s 2p^6 3s^2 3p^3$

Answer: C

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22. The atomic number of vanadium (V), chromium (Cr), manganese (Mn) and iron (Fe) are respectively $23, 24, 25, 26$. Which out of these may be expected to have the jump in second ionisation enthalpy?

A. Mn

B. Fe

C. V

D. Cr

Answer: D

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23. The ionisation potential of $X_{(g)}^{-}$ is numerically equal to

A. E.A. of $X_{(g)}$

B. EA of $X_{(g)}^{+}$

C. E.A. of $X_{(g)}^{2-}$

D. E.A of $X_{(g)}^{2+}$

Answer: A

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24. the correct order of electron gain enthalpy with negative sign of F, Cl, Br and I, having atomic number $9, 17, 35$ and 53 respectively is

A. $I > Br > Cl > F$

B. $F > Cl > Br > I$

C. $Cl > F > Br > I$

D. $Br > Cl > I > F$

Answer: C

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25. Regarding electron affinity, the wrong statement is

A. The E.A. of "Cl" is more than that of "F"

B. The E.A. of "S" is more than that of "P"

C. The E.A. of "Si" is more than that of "C"

D. The E.A. of "Ne" is more than that of "F"

Answer: D

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26. Electron affinity of chlorine is -348 kJ/mol. Then the electron affinity of Fluorine is .... In kJ/mol

A. -333

B. -348

C. -384

D. -428

Answer: A

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27. The electronegativity of the following elements increases in the order:

A. C, N, Si, P

B. N, Si, C, P

C. Si, P, C, N

D. P, Si, N, C

Answer: C

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28. The ionisation potential and electron affinity of an element "X" are 275 and 86 kcal/mole. Then the electronegativity of "X" according to Mulliken scale is

A. 4.0

B. 3.5

C. 2.8

D. zero

Answer: C

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29. Which of the following does not be considered as a fixed quantity A)Electronegativity B)First ionisation potential C)Electron affinity D)Second ionisation potential

A. Electronegativity

B. First ionisation potential

C. Electron affinity

D. Second ionisation potential

Answer: A

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30. The electronegativity of $K = 0.8$ and $Cl = 3.0$. The type of bond formed between "K" and "Cl" is

A. Pure covalent bond

B. Eydrogen bond

C. Metallic bond

D. Electrovalent bond

Answer: D

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31. An element "X" has $IP = 1681$ kJ/mole and $EA = -333$ kJ/mole then its electronegativity is

A. $1681 + 33/544$

B. $1681 - 333/544$

C. $1681 + 333/2$

D. $\frac{0.208\sqrt{1681 + 333}}{544}$

Answer: A

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32. Which of the following has zero electronegativity

A. Ar

B. Si

C. N

D. F

Answer: A

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33. Which of the following elements posses zero electron affinity (theriotically) and zero electronegativity values?

A. Halogens

B. Rlkali metals

C. Chalcogens

D. Rare gases

Answer: D

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34. The electronegativities of two elements A and B are 2.1 and 1.8. Then the type of bond formed between them is

A. Ionic bond

B. Pure covalent bond

C. Polar covalent bond

D. Hydrogen bond

Answer: C

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35. In a compound XY, the electronegativity difference between X and Y is greater than 1.7, then compound XY soluble in

A. Benzene

B. CCl_4

C. H_2O

D. CS_2

Answer: C

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36. The stable oxide state of Thallium, a III A group element is

A. $+1$

B. $+3$

C. -3

D. $+5$

Answer: A

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37. The stable oxidation sate (+8) is exhibited by

A. Co & Ni

B. Ru & Os

C. Cl & I

D. Te & I

Answer: B

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38. The formula of the compound formed by the pair of elements Al & S is:

A. Al_2S_3

B. Al_3S_2

C. Al_4S_3

D. AlS_3

Answer: A

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39. The oxidation state and valency of Al in $\left[AlCl(H_2O)_5\right]^{2+}$

A. $+6$ & 3

B. $+3$ & 63

C. $+6, 6$

D. $+3$ & 3

Answer: A

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40. An element has nine positive charges in its nucleus its common oxidation state is

A. $+7$

B. $+5$

C. -1

D. $+1$

Answer: C

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41. The outermost electronic configuration of most electropositive element is

A. ns^1

B. ns^2np^2

C. ns^2np^3

D. ns^2np^5

Answer: A

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42. The tendency if an element to lose an electron is called

A. Electronegativity

B. Non - metallic character

C. Electropositive character

D. Electron affinity

Answer: C

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43. Oxide that is most acidic

A. Cl_2O_7

B. SO_3

C. P_4O_{10}

D. N_2O_5

Answer: A

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44. Three elements, X, Y and Z belong to the same period. Their oxides are acidic, amphoteric and basic respectively. The order of electronegative of these elements in the periodic table is

A. X, Y, Z

B. Y, Z, X

C. X, Z, Y

D. Z, Y, X

Answer: D

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45. The elements 'X', 'Y' and 'Z' form oxides which are acidic, basic and amphoteric respectively. The correct order of their electro negativity is

A. $X > Y > Z$

B. $Z > Y > X$

C. $X > Z > Y$

D. $Y > X > Z$

Answer: C

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46. Chemical similarity between Be and Al is due to

A. Diagonal relationship

B. Both belong to same period

C. Similar outer electronic configuration

D. Inert pair effect

Answer: A

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47. Pair of ions with polarising power

A. Li^+, Mg^{2+}

B. Li^+, Na^+

C. Mg^{2+}, Ca^{2+}

D. Mg^{2+}, K^+

Answer: A

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Exercise 2 C W

1. The element cited as an example to prove the validity of Mendeleev's periodic law is

A. germanium

B. Scandium

C. gallium

D. all

Answer: D

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2. The term periodicity in the properties of element are arranged in the increasing order of their atomic numbers similar elements

A. recur after a fixed interval

B. recur after certain regular interval

C. Form vertical groups

D. Form horizontal rows

Answer: B

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3. The one which has incompletely filled d-orbitals in its ground state or in any one of its oxidation state is known as

A. s - and p -

B. d - only

C. f - only

D. both d - and f

Answer: A

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4. The name ‘Rare earths’ is used for

A. lanthanoids only

B. actinoids only

C. both lanthanoid and actinoids

D. Alkaline earth metals

Answer: A

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5. Give five characteristics of p-block elements.

A. The last electron in them enters into a p-orbital

B. They mostly form covalent compounds

C. In any row, the metallic character decreases form left to right

D. The oxidizing power decreases from left to right

Answer: D

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6. The 6th period of the periodic table contains

A. two s-block and six p-block elements

B. fourteen f-block elements

C. ten d - block elements

D. all the above

Answer: D

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7. Ionic radii vary in

A. inverse proportion to the effective nuclear charge

B. inverse proportion to the square of effective nuclear charge

C. inverse proportion to the screening effect

D. direct proportion to the square of screening effect

Answer: A

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8. Which of the following has largest radius?

A. $1s^2, 2s^2, 2p^6, 3s^2$

B. $1s^2, 2s^2, 2p^6, 3s^2, 3p^1$

C. $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$

D. $1s^2, 2s^2, 2p^6, 3s^2, 3p^5$

Answer: A

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9. An element which lies in the same group of the periodic table as mercury is

A. cadmium

B. gold

C. tin

D. thallium

Answer: A

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10. The correct order of the second ionisation potential of carbon, nitrogen, oxygen and fluorine is

A. $C > N > O > F$

B. $O > N > F > C$

C. $O > F > N > C$

D. $F > O > N > C$

Answer: C

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11. The order of decreasing atomic radii for Be, Na & Mg is

A. $Na < Mg < He$

B. $Mg < Na < He$

C. $Mg < He < Na$

D. $Na < He < Mg$

Answer: B

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12. From which of the following species in gaseous state it is easiest to remove an electron?

A. O (g)

B. $O^{2+}(g)$

C. $O^{+}(g)$

D. $O^{-}(g)$

Answer: B

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13. Ionisation of energy $F^{\ominus}$ is $320kJmol^{-1}$. The electronic gain enthalpy of fluorine would be

A. -320kJ mol^{-1}

B. -160kJ mol^{-1}

C. 320kJ mol^{-1}

D. $160 \mathrm{kJ\ mol}^{-1}$

Answer: A

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14. The element having very high ionization enthalpy but zero electron affinity is :-

A. H

B. F

C. He

D. Be

Answer: C

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15. The first ionisation potential of Na is $5.1eV$. The value of eectrons gain enthalpy of Na^+ will be

A. $+2.55eV$

B. $-2.55eV$

C. $-5.1eV$

D. $-10.2eV$

Answer: C

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16. Among halogens, the correct order of amount of energy released in electron gain (electron gain enthalpy) is:

A. $F > Cl > Br > I$

B. $F < Cl < Br < I$

C. $F < Cl > Br > I$

D. $F < Cl < Br < I$

Answer: C

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17. The formation of oxide ion $O^{2-}(g)$ from oxygen atom requires first an exothermic and then an endothermic step as shown below

$O(g) + e^- \rightarrow O^-(g), \Delta H^- = -141 kjmol^{-1}$

$O^-(g) + e^- \rightarrow O^{2-}(g), \Delta H^- = +780 kjmol^{-1}$

Thus, process of formation of O^{2-} in gas phase is unfavourable even through O^{2-} is isoelectronic with neon. It is due to the fact that A) oxygen is more electronegative B) addition of electron in oxygen results in larget size of the ion C) electron repulsion outweights the stability gained by achieving noble gas configuration D) O^- ion has comparatively smaller size than oxygen atom

A. oxygen is more electronegative

B. addition of electron in oxygen results in larger size of the ion

C. electron repulsion outweighs the stability gained by achieving noble gas configuration

D. O^- ion has comparatively smaller size than oxygen atom

Answer: C

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18. Electronic configuration of four elements A, B ,C and D are given below

A) $1s^2, 2s^2, 2p^6$

B) $1s^2, 2s^2, 2p^4$

C) $1s^2, 2s^2, 2p^6, 3s^1$

D) $1s^2, 2s^2, 2p^5$

Which of the following is the correct order of increasing tendency to gain electron?

A. $A < C < B < D$

B. $A < B < C < D$

C. $D < B < C < A$

D. $D < A < B < C$

Answer: A

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19. The ionisation energy and electron affinity of an element are 13.0ev and 3.8 ev respectively. Its electronegativity is

A. 4.0

B. 3.5

C. 3.0

D. 2.8

Answer: C

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20. The electronegativity of cesium is 0.7 and that of flourine is 4.0 The bond formed between the two is:

A. 3.0

B. 3.20

C. 2.90

D. 3.10

Answer: B

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21. If the ionization enthalpy and electron gain enthalpy of an element are 275 and 86 kcal mol^{-1} respectively, then the electronegativity of the element on the Pauling scale is

A. 1.0

B. 2.8

C. 4.0

D. 3.5

Answer: B

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22. Calculate the effective nuclear charge experienced by the $4s$-electron in potassium atom $(Z = 19)$.

A. 2.31

B. 2.64

C. 5.19

D. 2.1

Answer: A

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23. Which of the following element is most electropositive?

A. $[He]2s^1$

B. $[He]2s^2$

C. $[Xe]6s^1$

D. $[Xe]6s^2$

Answer: C

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24. Which of the following elements has zero electron affinity ?

A. Platinum

B. gold

C. Sulphur

D. Neon

Answer: D

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25. The first ionization energy value of an element area 191, 578,872 and 5692 kcals. The number of valence electrons in the element are

A. 1

B. 2

C. 3

D. 4

Answer: C

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26. Which of the following elements represents highly electropositive as well as highly electronegativity element in its period. ?

A. Hydrogen

B. Nitrogen

C. Fluorine

D. None

Answer: A

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27. Although metals form basic oxides, which of the following metals form an amphoteric oxide ?

A. Ca

B. Fe

C. Cu

D. Zn

Answer: D

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28. The order in which the following oxides are arranged according to decreasing basic nature is A)CuO, Na_2O, MgO, Al_2O_3 B) Al_2O_3, MgO, CuO, Na_2O C)MgO, Al_2O_3, CuO, Na_2O D) Na_2O, MgO, Al_2O_3, CuO

A. Na_2O, MgO, Al_2O_3, CuO

B. CuO, Al_2O_3, MgO, Na_2O

C. Al_2O_3, CuO, MgO, Na_2O

D. CuO, MgO, Na_2O, Al_2O_3

Answer: A

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29. An element of atom mass 39 has the electron configuration 2,8,8,1 which of the following statements are correct ? a)it is transition element

b)its isotone is $._{18}^{38}Ar$ c)its isotone oxide is M_2O d)its first ionisation value is high

A. The element's valency is

B. The element exists as a diatomic molecule

C. The element is a non-metallic in nature

D. The element forms forms a basic oxide

Answer: D

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30. Match the entries of Column I with appropriate entries of Column II and chose the correct option out of the four options (a), (b), (c) and (d) given at the end of each question.

Column I

(A) Ionization enthalpy

(B) Electron gain enthalpy

(C) Electronegativity

(D) Oxidation number

Column II

(p) Amount of energy released when an extra electron is added to any neutral gaseous atom.

(q) The change of partial charge which comes by transfer or partial shifting of electron in any atom during its compound formation.

(r) Minimum amount of energy required to remove an electron from an isolated gaseous atom.

(s) Relative tendency of an atom to attracts shared pair of electrons towards itself in molecule.

A. A-q, B-r, C-p, D-s

B. A-r, B-p, C-s, D-q

C. A-s, B-q, C-p, D-r

D. A-p, B-q, C-r, D-s

Answer: B

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31. Match the entries of Column I with appropriate entries of Column II and chose the correct option out of the four options (a), (b), (c) and (d) given at the end of each question.

Column I	Column II
(A) Chlorine	(p) Transition element
(B) Helium	(q) Highest electron gain enthalpy
(C) Iron	(r) Highest ionization enthalpy
(D) Lithium	(s) Strongest reducing agent

A. A-q, B-r, C-p, D-s

B. A-p, B-q, C-r, D-s

C. A-r, B-q, C-p, D-s

D. A-q, B-p, C-r, D-s

Answer: A

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32. Match the entries of Column I with appropriate entries of Column II and chose the correct option out of the four options (a), (b), (c) and (d)

given at the end of each question.

Column I	Column II
(A) Isoelectronic series	(p) $A^+ +$ energy $\rightarrow A^{++} + e^-$
(B) Half - filled	(q) Ar, K^+, Ca^{2+}
(C) second ionization enthalpy	(r) Cerium
(D) Lanthanoid	(s) Nitrogen

A. A-r, B-s, C-p, D-q

B. A-s, B-p, C-r, D-q

C. A-q, B-s, C-p, D-r

D. A-s, B-r, C-q, D-p

Answer: C

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33. Which of the following sequences contain atomic numbers of only representative elements ?

A. 3, 33, 53, 87

B. 2, 10, 22, 36

C. $7, 17, 25, 37, 48$

D. $9, 35, 51, 60$

Answer: A

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34. Which of the following elements will gain one electron more readily in comparison to other elements of their group?

A. N (g)

B. Na (g)

C. O (g)

D. Cl (g)

Answer: D

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35. Which of the following statements are correct ?

A. Helium has the highest first ionisation enthalpy in the periodic table

B. Chlorine has less negative electron gain enthalpy than fluorine

C. Mercury and bromine are liquids at room temperature

D. Both (1) and (3)

Answer: D

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36. Which of the following sets contain only isoelectronic ions?

A. $Zn^{2+}, Ca^{2+}, Ga^{3+}, Al^{3+}$

B. $K^{+}, Ca^{2+}, Sc^{3+}, Cl^{-}$

C. $P^{3-}, S^{2-}, Cl^{-}, K^{+}$

D. Both (2) and (3)

Answer: D

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37. In which of the following options order of arrangement does not agree with the variation of property indicated against it ? A) $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (increasing ionic size) B) $B < C < N < O$ (increasing first ionisation enthalpy) C) $I < Br < Cl < F$ (increasing electron gain enthalpy) D) $Li < Na < K < Rb$ (increasing metallic radius)

A. $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (increaseing ionic size)

B. $B < C < N < O$ (increasing first ionisation enthalpy)

C. $IGtBr > Cl > F$ (increasing electron gain enthalpy

D. $Li < Na < K < Rb$ (increasing metallic radius)

Answer: B

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38. Which of the following have no unit?

A. Electronegativity

B. Electron gain enthalpy

C. Ionisation enthalpy

D. Atomic radii

Answer: A

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39. An element belongs to 3rd period and group 13 of the periodic table. Which of the following properties will be shown by the element ?

A. Good conductor of electricity

B. Liquid, metallic

C. Solid, metallic

D. Both (1) and (3)

Answer: D

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40. Which is incorrectly matched

A.

Element	Atomic radius (pm)
Be	111

B.

Element	Atomic radius (pm)
C	112

C.

Element	Atomic radius (pm)
O	66

D.

Element	Atomic radius (pm)
B	88

Answer: B

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41. Electronic configuration of some elements is given in Column I and their electron gain enthalpies are given in column-II. Match the electronic configuration with electron gain enthalpy.

Column-I ctronic configuraion)	Column-II (Electron gain enthalpy/kj mol)
C. $1s^2 2s^2 2p^6$	1) -53
B. $1s^2 2s^2 2p^6 3s^1$	2) -328
C. $1s^2 2s^2 2p^5$	3) -141
D. $1s^2 2s^2 2p^4$	4) +48

A. (i-A), (ii-B), (iii-C), (iv-D)

B. (i-D), (ii-A), (iii-B), (iv-C)

C. (i-B), (ii-A),(iii-C),(iv-D)

D. (i-D),(ii-A),(iii-C),(iv-B)

Answer: B

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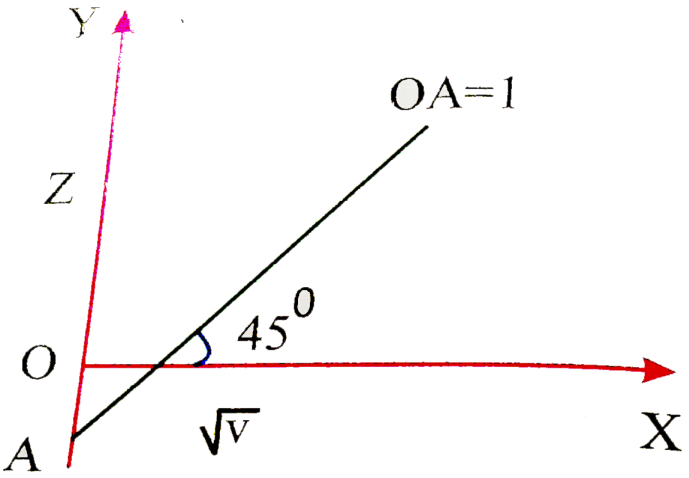
Exercise 2 H W

1. The frequency of the characterstic X ray of K_α line of metal targent 'M' is $2500cm^{-1}$ and the graoh between $\sqrt{v}$ Vs 'z' is as follows, then atomic number of M is



A. 49

B. 50

C. 51

D. 25

Answer: C

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2. Which of the following does not represents the correct order of the property indicated ?

A. $Sc^{3+} > Cr^{3+} > Fe^{3+} > Mn^{3+}$ ionic radii

B. $Sc > Ti > Cr > Mn$ density

C. $Mn^{2+} > Ni^{2+} < Co^{2+} < Fe^{2+}$ ionic radii

D. $FeO < CaO > MnO > CuO$ basic nature

Answer: A

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3. EN of the element (A) is E_1 and IP is E_2. Then EA will be

A. $2E_1 - E_2$

B. $E_1 - E_2$

C. $E_1 - 2E_2$

D. $(E_1 + E_2)/2$

Answer: A

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4. The correct order of atomic radii is

A. $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

B. $Ce^{3+} < Yb^{3+} < Pm^{3+} < La^{3+}$

C. $Yb^{3+} < Pm^{3+} < La^{3+} < Ce^{3+}$

D. $Pm^{3+} < La^{3+} < Ce^{3+} < Yb^{3+}$

Answer: A

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5. In which of the following arrangements, the order is not correct according to the property indicated against it. a)increase size : $Cu^{2+} < Cu^{+} < Cu$ b)increasing $IE_1 : B < C < N < O$ c)increasing $IE_1 : Na < Al < Mg < Si$ d)increasing $IE_1 : Li < Na < K < Rb$

A. Increasing size $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$

B. Increaseing $IE_1 : B < C < N < O$

C. Increasing $EA_1 : I < Br < F < Cl$

D. Increasing metallic radius : $Li < Na < K < Rb$

Answer: B

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6. Successive ionisation potentials of an element M are $8.3, 25.1, 37.9, 259.3$ and 340.1 ev. The formula of its bromide is

A. MBr_5

B. MBr_4

C. MBr_3

D. MBr_2

Answer: C

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7. The IP_1, IP_2, IP_3 and IP_4 of an element A are $6.0, 10.0, 16.0$ and $45.0ev$ respectively. The molecular weight of the oxide of the element A is (x is atomic weight)

A. $x + 48$

B. $2x + 48$

C. $3x + 48$

D. $x + 32$

Answer: B

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8. H-H, X-X and $H-X$ bond energies are $104 Kcal/\text{mole} 60 Kcal/\text{mole}$ and $101 kcal/\text{mole}$. Assuming the electronegativity of hydrogen to be 2.1 the electronegativity of unknown element X is $\left(\sqrt{19}=4.36\right)$

A. 3.5

B. 3

C. 4

D. 2.5

Answer: B

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9. The ionisation energy and electron affinity of an element are 13.0ev and 3.8 ev respectively. Its electronegativity is

A. 2.8

B. 3.0

C. 3.5

D. 4.0

Answer: B

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10. The bond energies of H-H, X-X and H-X are $104K.\ cal$, $38K.\ cal$ and $138K.\ Cal$ respectively the electron egativity of 'X' is $\left[\sqrt{67} = 8.18\right]$

A. 3.0

B. 3.5

C. 3.8

D. 1.7

Answer: C

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11. The atomic numbers of elements A,B,C and D are Z - 1, Z, Z + 1 and Z + 2 respectively. If B is a noble gas, choose the correct statement among the following statements :

I. A has higher electron affinity.

II. C exists in +2 oxidation state.

III. D is an alkaline earth metal.

A. $a \& b$

B. $b \& c$

C. $a \& c$

D. $a, b \& c$

Answer: C

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12. $M_{(g)} \rightarrow M^{+}_{(g)} + e^{-}, \Delta H = 100eV$

$M_{(g)} \rightarrow M^{2+}_{(g)} + 2e^{-}, \Delta H = 250eV$ which is incorrect statement?

A. I_1 of $M_{(g)}$ is 100 eV

B. I_1 of $M^{1}_{(g)}$ is 150 eV

C. I_2 of $M_{(g)}$ is 250 eV

D. I_2 of $M_{(g)}$ is 150 eV

Answer: C

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13. The increasing order of the first ionization enthalpies of the elements B,P,S and F (lowest first) is:

A. $F < S < P < B$

B. $P < S < B < F$

C. $B < P < S < F$

D. $B < S < P < F$

Answer: C

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14. Using the data given below,predict the nature of heat changes for the reaction .

$Mg_g + 2F_g \rightarrow Mg_g^{2+} + 2F_g^-$

IE_1 and IE_2 of $Mg_g$are 737.7 and $451 kJ mol^{-1}$. EA_1 for F_g is $-328 kJ mol^{-1}$.

A. 1232.4 KJ $mole^{-1}$

B. $+1532.7$ KJ $mole^{-1}$

C. -1232.4 KJ $mole^{-1}$

D. -1532.7 KJ $mole^{-1}$

Answer: B

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15. The IE_1 and IE_2 of Mg (g) are 740 and $1450 kJmol:^{-1}$. Calculate the percentage of Mg^+ (g) and Mg^{2+} (g) if 1g of Mg (g) absorbs 50 kJ of energy.

A. $\% Mg^+ = 50$ and $\% Mg^{+2} = 50$

B. $\% Mg^+ = 70.13$ and $\% Mg^{+2} = 29.87$

C. $\% Mg^+ = 75$ and $\% Mg^{+2} = 25$

D. $\% Mg^+ = 60$ and $\% Mg^{+2} = 40$

Answer: B

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16. How many Cs atoms can be convered to Cs^+ ions by 1 joule energy if IE_1 for Cs is 376 $KJ\text{mole}^{-1}$

A. 1.6×10^{18}

B. 1.6×10^{10}

C. 5.8×10^{14}

D. 5.8×10^{25}

Answer: A

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17. The elecron affinity of chlorine is $3.7eV$. How much energy in kcal is released when $2g$ chlorine is completely converted to cl^- ion in a gaseous state ?

$\left(1eV = 23.06kcal\text{mol}^{-10}\right)$.

A. 4.8 Kcal

B. 2.4 Kcal

C. 10.2 Kcal

D. 14.2 Kcal

Answer: A

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18. The energy needed for $Li_{(g)} \rightarrow Li_{(g)}^{+3} + 3e^-$ is $1.96 \times 10^4 \text{KJ mole}^{-1}$. If the first ionisation energy of Li is 520 KJ mole^{-1} calculate second ionisation energy for Li. Given IE_1 for $H = 2.18 \times 10^{-18} \text{J atom}^{-1}$

A. 5270KJ mole^{-1}

B. 3210KJ mole^{-1}

C. 7270KJ mole^{-1}

D. 9290KJ mole^{-1}

Answer: C

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19. Following statements regarding the periodic trends of chemical reactivity of the alkali metals and the halogens are given. Which of these statements gives the correct picture: A)In alkali metals the reactivity increases but in the halogens it decreases with increase in atomic number down the group B)The reactivity decreases in the alkali metals but increases in the halogens with increases in atomic number down the group. C)In both the alkali metals and the halogen the chemical reactivity decreases with increases in atomic number down the group D)Chemical reactivity increases with increases in atomic number down the group in both the alkali metals and halogens.

A. In alkali metals the reactivity increases but in the halogens it decreases with increase in atomic number down the group.

B. The reactivity decreases in the alkali metals but increases in the halogens with increases in atomic number down the group.

C. In both the alkali metals and the halogen the chemical reactivity decreases with increases in atomic number down the group.

D. Chemical reactivity down the group in both the alkali metals and halogens.

Answer: A

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20. Which of the following represent the correct order of increasing first ionisation enthalpy for Ca, Ba, S, Se and Ar

A. $Ca < S < Ba < Se < Ar$

B. $S < Se < Ca < Ba < Ar$

C. $Ba < Ca < Se < S < Ar$

D. $Ca < Ba < S < Se < Ar$

Answer: C

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21. The correct sequence which shows decreasing order of the ionic radii of the elements is

A. $Al^{3+} > Mg^{2+} > Na^{+} > F^{-} > O^{2-}$

B. $Na^{+} > Mg^{2+} > Al^{3+} > O^{2-} > F^{-}$

C. $Na^{+} > F^{-} > Mg^{2+} > O^{2-} > Al^{3+}$

D. $O^{2-} > F^{-} > Na^{+} > Mg^{2+} > Al^{3+}$

Answer: D

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22. The set representing the correct order of ionic radius is

A. $Li^{+} > Be^{+} > Na^{+} > Mg^{2+}$

B. $Na^{+} > Mg^{2+} > Li^{+} > Be^{2+}$

C. $Li^{2+}tNa^{+} > Mg^{2+} > Be^{2+}$

D. $Mg^{2+} > Be^{2+} > Li^{+} > Na^{+}$

Answer: B

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23. The charge/size ratio of a cation determines its polarising power. Which one of the following sequeces represents the increasing order of the polarising power of the cationic species, K^+, Ca^{2+}, Mg^{2+}, Be^{2+}?

A. $Mg^{2+} < Be^{2+} < K^+ < Ca^{2+}$

B. $Be^{2+} < K^+ < Ca^{2+} < Mg^{2+}$

C. $K^+ < Ca^{2+} < Mg^{2+} < Ba^{2+}$

D. $Ca^{2+} < Mg^{2+} < Be^{2+} < K^+$

Answer: C

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Exercise 3

1. The correct of decreasing second ionisation enthalpy of $Ti(22), V(23), Cr(24)$ and $Mn(25)$ is

A. $Ti > V > Cr > Mn$

B. $Cr > Mn > V > Ti$

C. $V > Mn > Cr > Ti$

D. $Mn > Cr > Ti > V$

Answer: B

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2. Which of the following oxides is not expected to react with sodium hydroxide ?

A. B_2O_3

B. CaO

C. SiO_2

D. BeO

Answer: B

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3. Which of the following is the strongest oxidising agent ?

A. F_2

B. Br_2

C. I_2

D. Cl_2

Answer: A

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4. Which one of the following electronic configuration of an atom has the highest ionisation energy?

A. $Ne\left[3s^2 3p^3\right]$

B. $Ne\left[3s^2 3p^2\right]$

C. $Ar\left[3d^{10} 4s^2 4p^3\right]$

D. $Ne\left[3s^2 3p^1\right]$

Answer: A

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5. The stability of $+1$ oxidation state increases in the sequence :

A. $Al < Ga < In < Tl$

B. $Tl < In < Ga < al$

C. $In < Tl < Ga < Al$

D. $Ga < In < Al < Tl$

Answer: A

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6. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl?

A. $F < S < O < Cl$

B. $S < O < Cl < F$

C. $Cl < F < O < S$

D. $O < S < F < Cl$

Answer: D

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7. Among the following which has the highest cation to anion size ratio ?

A. LiF

B. NaF

C. CsI

D. CsF

Answer: D

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8. Among the following Ca ,Mg, P and CI the order of increasing atomic radius is

A. $P < Cl < Ca < Mg$

B. $Ca < Mg < P < Cl$

C. $Mg < Ca < Cl < P$

D. $Cl < P < Mg < Ca$

Answer: D

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9. The first ionisation potential of Na is $5.1eV$. The value of eectrons gain enthalpy of Na^+ will be

A. $-5.1eV$

B. $-10.2eV$

C. $+2.55eV$

D. $+10.2eV$

Answer: A

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10. which of the following oxide is amphoteric ?

A. SnO_2

B. CaO

C. SiO_2

D. CO_2

Answer: A

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11. Which of the following lanthanoids ions is diamagnetic?

A. Sm^{2+}

B. Eu^{2+}

C. Yb^{2+}

D. Ce^{2+}

Answer: D

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12. Which of the following orders of ionic radii is correctly represented?

A. $Al^{3+} > Mg^{2+} > N^{3-}$

B. $H^- > H^+ > H$

C. $Na^+ > F^- > O^{2-}$

D. $O^{2-} > F^- > Na^{\oplus}$

Answer: D

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13. Be^{2+} is isoelectronic with which of the following ions ?

A. Mg^{2+}

B. H^+

C. Li^+

D. Na^+

Answer: C

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14. The species Ar, K^+ and Ca^{2+} contain the same number of electrons. In which order do their radii increase ?

A. $Ca^{2+} < K^+ < Ar$

B. $K^+ < Ar < Ca^{2+}$

C. $Ar < K^+ < Ca^{2+}$

D. $Ca^{2+} < Ar < K^+$

Answer: A

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15. The formation of oxide ion $O^{2-}(g)$ from oxygen atom requires first an exothermic and then an endothermic step as shown below

$O(g) + e^- \rightarrow O^-(g), \Delta H^- = -141 kjmol^{-1}$

$O^-(g) + e^- \rightarrow O^{2-}(g), \Delta H^- = +780 kjmol^{-1}$

Thus, process of formation of O^{2-} in gas phase is unfavourable even through O^{2-} is isoelectronic with neon. It is due to the fact that A) oxygen is more electronegative B) addition of electron in oxygen results in larget size of the ion C) electron repulsion outweights the stability gained by achieving noble gas configuration D) O^- ion has comparatively smaller size than oxygen atom

A. oxygen is more electronegative

B. addition of electron in oxygen results in larger size of the ion

C. electron repulsion outweighs the stability gained by achieving noble gas configuration

D. O^- ion has comparatively smaller size than oxygen atom

Answer: C

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16. In which of the following options the order arrangement does not agree with the variation of property indicated against it?

A. $Li < Na < K < Rb$ (increasing metallic radius)

B. $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (increasing ionic size)

C. $B < C < N < O$ (increasing first ionization enthalpy)

D. $I < Br < Cl < F$ (increasing electron gain enthalpy)

Answer: D

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17. The electronic configuration of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are:

A. $[Xe]4f^7 6s^2$, $[Xe]4f^7 5d^1 6s^2 \& [Xe]4f^9 6s^2$

B. $[Xe]4f^7 6s^2$, $[Xe]4f^8 6s^2$ and $[Xe]4f^8 5d^1 6s^2$

C. $[Xe]4f^6 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

D. $[Xe]4f^5 5d^1 6s^2$

Answer: A

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Exercise 4

1.

Column -I (Atomic no. of elemets)	Column -II (IUPAC name)
$(A)105$	(P)Unn
$(B)107$	(Q)Uns
$(C)109$	(R)Unp
$(D)110$	(S)Une

A. A-R, B-P, C-S, D-Q

B. A-P, B-R, C-S, D-Q

C. A-R, B-Q, C-S, D-P

D. A-Q, B-R, C-S, D-P

Answer: C

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2. Match the following

Type - I	Type - II
Series	Elements
(A) 3d	(1) Sc[21] to Zn (30)
(B) 4d	(2) La(57), Hf (72)to Hg (80)
(C) 5d	(3) Ce(58) to Lr (103)
(D) 6d	(4) Y (39) to Cd(48)
	(5) Ac (89), Rf (104)to Mt (109)

The correct match is

A. A-5, B-4, C-2, D-3

B. A-1, B-4, C-2, D-5

C. A-1, B-4, C-3, D-5

D. A-2, B-5, C-1, D-4

Answer: B

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Type - I	Type - II
Property	Element with the highest value
(A) IP	(1) Cl
(B) EN	(2) Cs
(C) EA	(3) He
(D) atomic size	(4) F
	(5) H

3.

A. A-1, B-2, C-3, D-4

B. A-3, B-4, C-1, D-2

C. A-4, B-3, C-5, D-2

D. A-5, B-1, C-2, D-3

Answer: B

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4. Match the following

List - 1 (High value is observed for)	List - 2
(A) Ionisation potential	(1) Chlorine
(B) Electron positivity	(2) Caesium
(C) Electron affinity	(3) Helium
(D) Oxidation state	(4) Fluorine
	(5) Osmium

The correct match is

A. A-4, B-3, C-2, D-1

B. A-3, B-2, C-1, D-5

C. A-1, B-2, C-3, D-4

D. A-2, B-1, C-4, D-5

Answer: B

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5. Match the following in view of diagonal relation

List-1	List-2
A) Li	1) Al
B) Si	2) C
C) Be	3) B
	4) Mg

The correct match is

A. A-1, B--3, C-4

B. A-3, B-1, C-4

C. A-4, B-1, C-3

D. A-4, B-3, C-1

Answer: D

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6. Consider the isoelectronic species, Na^+, Mg^{2+}, F^- and O^{2-}. The correct order of increasing length of their radii is:

A. $F^- < O^{2-} < Mg^{2+} < Na^+$

B. $Mg^{2+} < Na^+ < F^- < O^{2-}$

C. $O^{2-} < F^- < Na^+ < Mg^{2+}$

D. $O^{2-} < F^- < Mg^{2+} < Na^+$

Answer: B

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7. Which of the following is not an actinoid?

A. Curium (Z = 96)

B. Californium (Z = 98)

C. Uranium (Z = 92)

D. Terbium (Z = 65)

Answer: D

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8. The order of screeing effect of electrons of s, p, d and f orbitals of a given shell of an atom on its outer shell electrons is:

A. $s > p > d > f$

B. $f > d > p > s$

C. $p < d < s > f$

D. $f > p > s > d$

Answer: A

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9. The first ionisation potential of Na, Mg, Al and Si are in the order

A. $Na < Mg > Al < Si$

B. $Na > Mg > Al > Si$

C. $Na < Mg < Al < Si$

D. $Na > Mg > Al < Si$

Answer: A

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10. The electronic configuration of gadolinium (At. No 64) is:

A. $[Xe]4f^3 5d^5 6s^2$

B. $[Xe]4f^7 5d^2 6s^1$

C. $[Xe]4f^7 5d^1 6s^2$

D. $[Xe]4f^8 5d^6 6s^2$

Answer: C

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11. The statement that is not correct for periodic classification of elements is

A. The properties of elements are periodic function of their atomic numbers.

B. Non metallic elements are less in number than metallic elements.

C. For transition elements, the 3d-orbitals are filled with electrons after 3p-orbitals and before 4s-orbitals.

D. The first ionisation enthalpies of elements generally increase with increase in atomic number as we go along a period.

Answer: C

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12. Among halogens, the correct order of amount of energy released in electron gain (electron gain enthalpy) is:

A. $F > Cl > Br > I$

B. $F < Cl < Br < I$

C. $F < Cl > Br > I$

D. $F < Cl < Br < I$

Answer: C

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13. The period number in the long form of the periodic table is equal to

A. magnetic quantum number of any element of the period

B. atomic number of any element of the period

C. maximum Principal quantum number of any element of the period

D. maximum Azimuthal quantum number of any element of the period

Answer: C

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14. The elements in which electrons are progressively filled in 4f-orbitals are calleD:

A. actinoids

B. Transition elements

C. lanthanoids

D. halogens

Answer: C

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15. Which one of the following is correct order of the size of iodine species ?

A. $I > I^- > I^+$

B. $I^+ > I^- > I$

C. $I > I^+ > I^-$

D. $I^- > I > I^+$

Answer: D

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16. The formation of oxide ion $O^{2-}(g)$ from oxygen atom requires first an exothermic and then an endothermic step as shown below

$O(g) + e^- \rightarrow O^-(g), \Delta H^- = -141 kjmol^{-1}$

$O^-(g) + e^- \rightarrow O^{2-}(g), \Delta H^- = +780 kjmol^{-1}$

Thus, process of formation of O^{2-} in gas phase is unfavourable even through O^{2-} is isoelectronic with neon. It is due to the fact that A) oxygen is more electronegative B) addition of electron in oxygen results in larget size of the ion C) electron repulsion outweights the stability gained by achieving noble gas configuration D) O^- ion has comparatively smaller size than oxygen atom

A. oxygen is more electronegative

B. addition of electron in oxygen results in larger size of the ion

C. electron repulsion outweighs the stability gained by achieving noble gas configuration

D. O^- ion has comparatively smaller size than oxygen atom

Answer: C

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17. Electronic configuration of four elements A, B ,C and D are given below

A) $1s^2, 2s^2, 2p^6$

B) $1s^2, 2s^2, 2p^4$

C) $1s^2, 2s^2, 2p^6, 3s^1$

D) $1s^2, 2s^2, 2p^5$

Which of the following is the correct order of increasing tendency to gain electron?

A. $A < C < B < D$

B. $A < B < C < D$

C. $D < B < C < A$

D. $D < A < B < C$

Answer: A

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